

Ground Water Quality in the Treasure Valley

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Idaho Department of Water Resources

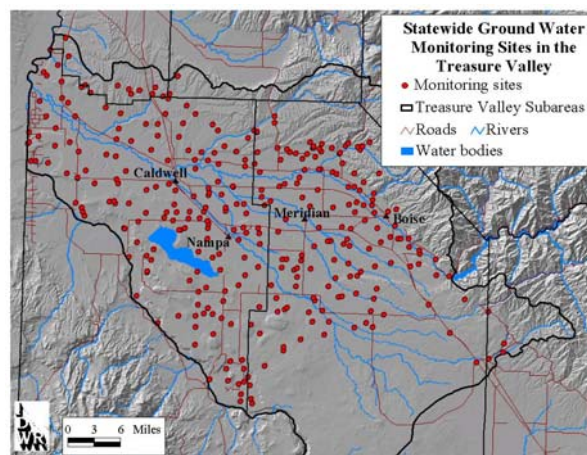


The Idaho Department of Water Resources has been collecting ground water quality data through the Statewide Program since 1990. Over 1,900 monitoring sites (existing wells and springs) have been sampled. The objectives of the Statewide Program are:

1. **Determine ground water quality in the state's major aquifers.**
2. **Detect changes and trends in ground water quality**
3. **Identify areas where ground water quality problems exist or may be emerging**

The Treasure Valley of southwest Idaho contains 330 Statewide Program sites (~17%). The number of sites for this area (and the other areas in Idaho) were initially estimated based on three factors: available water quality, size of the geographic area, and population. Since the Treasure Valley has a large population, the number of Statewide sites for this area was higher than for most of the other 19 hydrogeologic subareas.

From deep to the shallow, the three major aquifer systems in the Treasure Valley are 1) Idavada Group, 2) Idaho Group, and 3) Snake River Group. The Idavada Group is geothermal (water temperatures greater than 85 degrees Fahrenheit); the other two Groups comprise the non-thermal water that is used for domestic, irrigation, stock and industrial applications. The Statewide



Statewide Program monitoring sites.

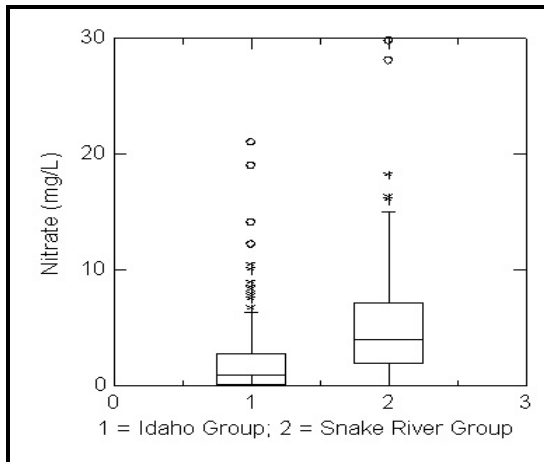
Program tested wells completed in the Idaho and Snake River Groups.

The Idaho Group consists of fine-grained sands that are usually separated by thick layers of clays. The Idaho Group aquifers are generally under artesian pressure with some wells free-flowing at the land surface. The Snake River Group aquifers are comprised of sands, gravels, cobbles and some clays. These aquifers are unconfined to mildly confined.

There are distinct differences in water quality between the Idaho Group and the Snake River Group. Neely and Crockett (1998) documented that the medians for 18 out of 22 water quality parameters and constituents were significantly different at the 95 percent confidence level for the two groups. Overall, the Idaho Group has less mineralized water and has received fewer impacts from land surface activities than the Snake River Group.

Ground water quality concerns in the Treasure Valley include nitrate, arsenic, uranium, bacteria, volatile organic compounds, and pesticides.

The median nitrate for the Snake River Group was 4 milligrams per Liter (mg/L); for the Idaho Group, the median was 0.9 mg/L. Statewide Program data show that about 41 percent of the Snake River Group monitoring sites had nitrate greater than 5 milligrams per Liter, while only 12 percent of the Idaho Group aquifers exceed this amount.

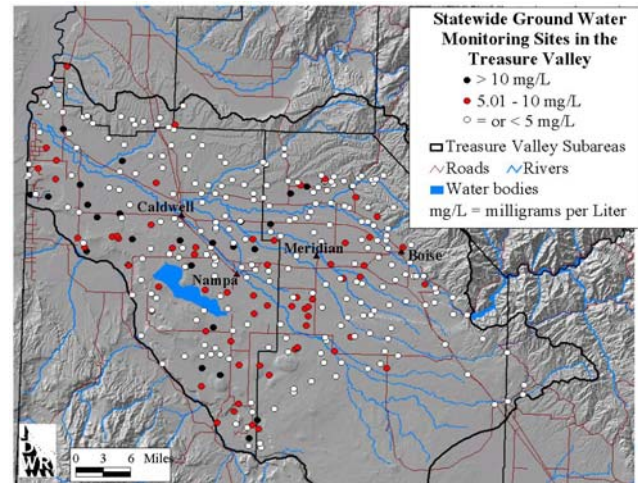


Nitrate comparison between the Idaho and Snake River Groups.

Twenty-two of the 172 Snake River Group wells had nitrate over 10 mg/L, which is the maximum contaminant level for nitrate in public water supplies. Stock wells had the highest median nitrate value (7.3 mg/L) followed by domestic (2.7 mg/L) and irrigation (2.3 mg/L) with public supplies having the lowest median (1.3 mg/L).

Nitrate problems were more common in Canyon County than in Ada County, and more common south of the Boise River than north of it. Trend analyses indicate that the median nitrate value for the Snake River Group increased from the First Round of the program (1991-1994) to the later years at the 95 percent confidence level. Regional studies show that the nitrate increases in the Lower Boise/Canyon Nitrate Priority Area (mostly in Canyon County) have been greater than the overall changes in the entire Treasure Valley.

Arsenic concentrations greater than 10 micrograms per Liter occurred throughout the Treasure Valley but were much more



Nitrate concentrations in the Treasure Valley.

common in Canyon County than in Ada County (Neely, 2002). About nine percent of the wells tested positive for fecal coliform bacteria. Pesticide detections occurred in over 50 percent of the Snake River Group sites and about 30 percent of the Idaho Group sites, but the concentrations were well below health concerns at most sites. Detections of volatile organic compounds were rare, but discoveries by other programs show that they are a problem in some parts of the Treasure Valley.

A recent study by Welhan (2004) showed that computer statistical programs could be used to analyze ground water quality trends in Idaho. The results document “hot spots” in the Treasure Valley where nitrate concentrations are increasing. Neely (in preparation) analyzed ground water quality in the Lucky Peak to Star Bridge Tributary Area in an effort to determine if water chemistry could be used in combination with other data for conjunctive administration of surface and ground water. Although the results are not conclusive related to efficacy of using water chemistry data for conjunctive management purposes, it is clear that water chemistry differences exist between the Snake River Group and Idaho Group in this area, and that within these groups, there are lateral variations that might be useful for understanding flowpaths and hydraulic connections.